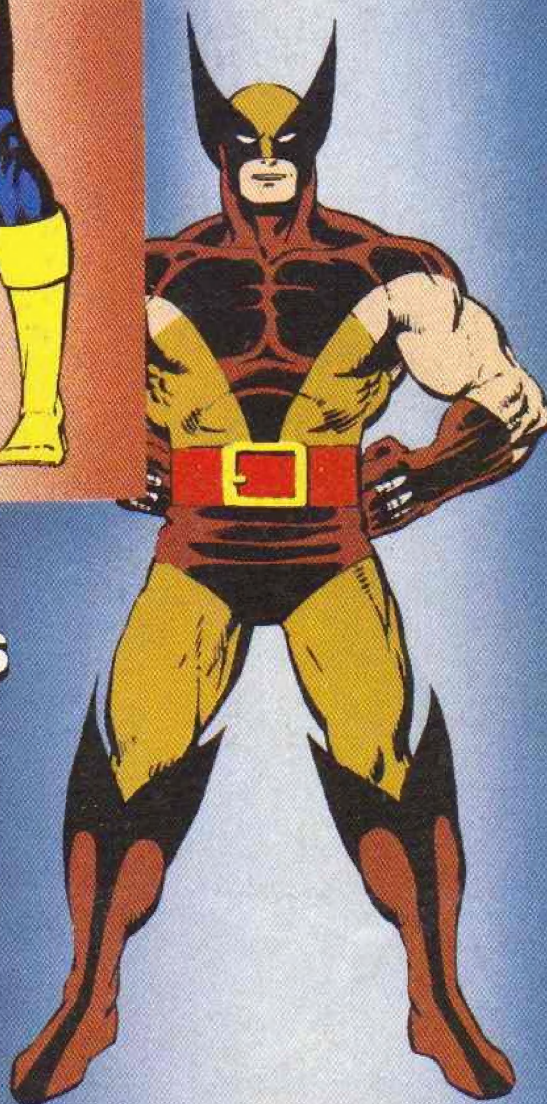
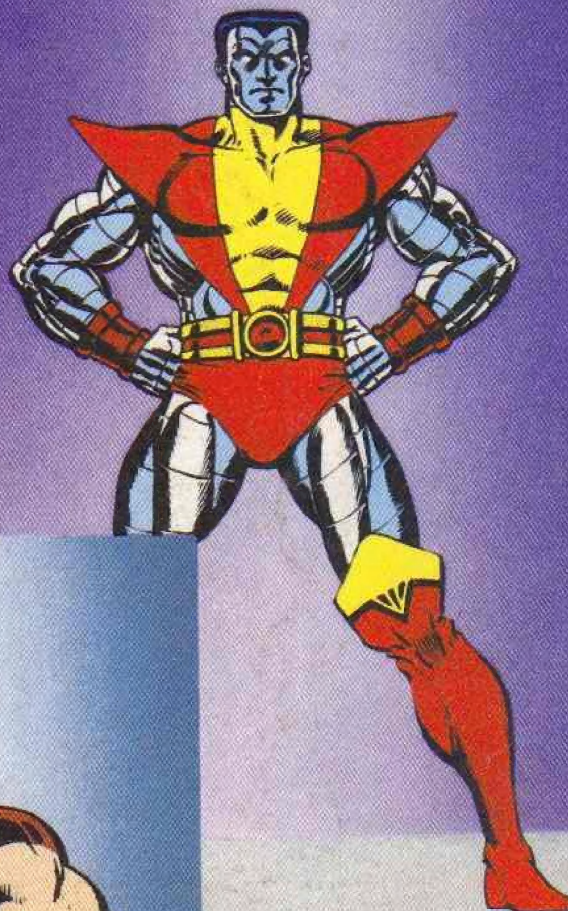
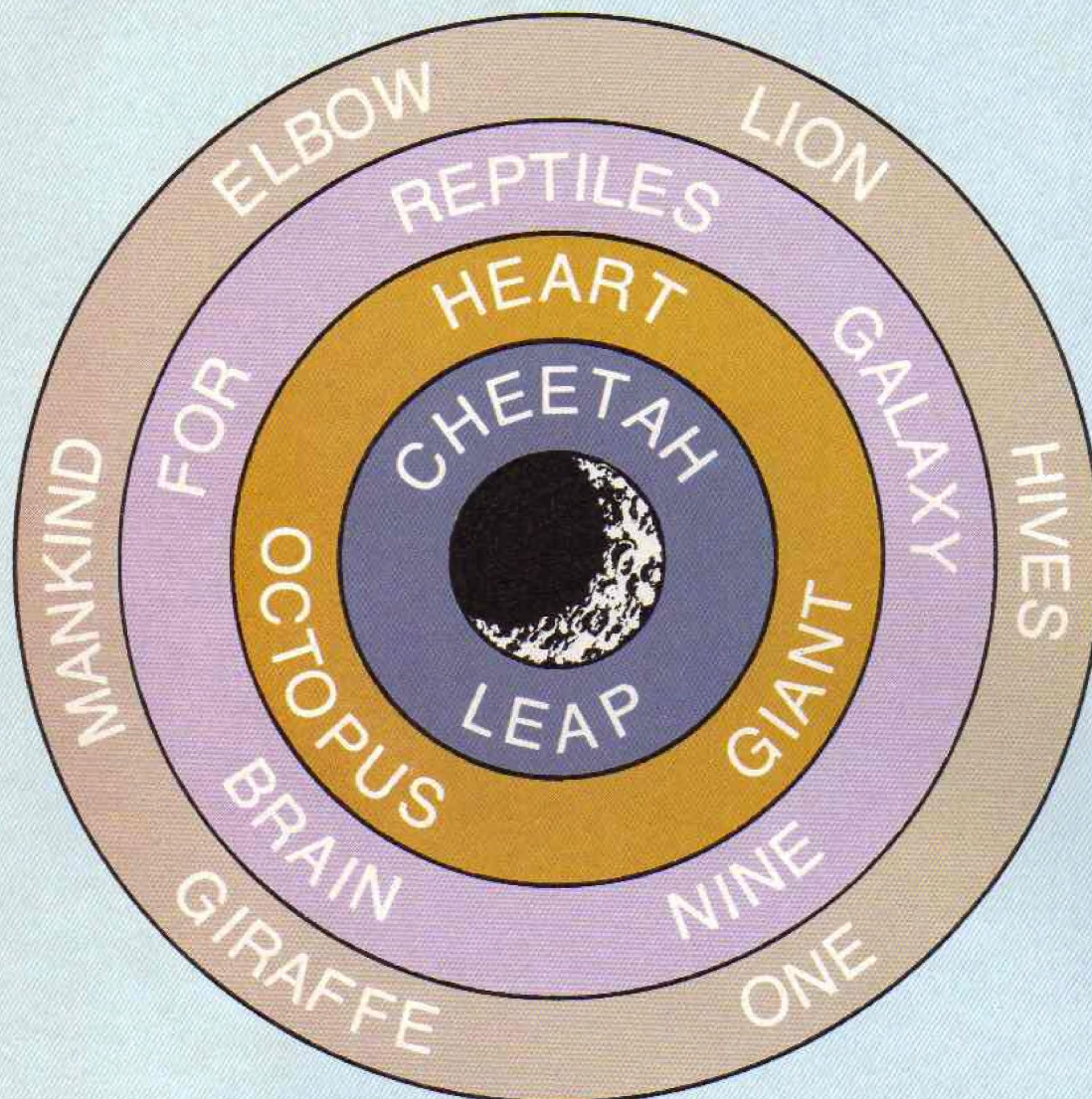


321 CONTACT



**Mutants
in Fact
and
Fiction!**





Far Out

The answer to each of the questions below is listed on the rings of light surrounding the moon. Unscramble the remaining words and they'll form part of a famous "out of this world" message. **Answer on page 35.**

1. How many planets orbit the sun?
2. What is the world's tallest animal?
3. What kind of animals were dinosaurs?
4. Where do honey bees live?
5. What is a group of millions of stars called?
6. Which animal can run faster than any other?
7. What organ tells the rest of the body what to do?
8. Which sea creature has eight arms?
9. What organ pumps blood throughout the body?
10. What is the largest member of the cat family?
11. What part of the arm is your funny bone near?

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On Our Front Cover: Four of the most popular comic book Mutants include from left to right: Cyclops, Wolverine, Colossus and Ariel.

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THOSE MARVELOUS MUTANTS

TODAY'S NEW
COMIC BOOK
HEROES

by V. Gates

ART BY JOHN ROMITA, JR. AND DAN GREEN



ART BY JOHN ROMITA, JR. AND DAN GREEN

NIGHTCRAWLER

STORM

Where can you find a woman who creates a hurricane by just thinking about it? Or a man who makes snowballs out of thin air? In comic books, of course.

These amazing people—and other comic characters like them—are called *mutants*. Of course, mutants with their amazing powers could never exist in real life. Their world is found only on the pages of comic books.

Chris Claremont is a writer of “The X-Men” and “The New Mutants”—two of the most popular comics with mutant characters. Chris told 3-2-1 CONTACT that the mutants actually receive their powers *before* they are born while earlier comic superheroes got their powers *after* they were born.

For instance, Spiderman was just an average person until he was bitten by a radioactive spider. And the Hulk was an ordinary guy until he was zapped with gamma rays.

Comic Mutants Are Born, Not Made

But the powers of today's mutants come from *within* the heroes themselves. They are born with their amazing gifts. Usually a parent of the mutant is exposed to dangerous radiation. This causes one of the parent's genes to change or mutate. (Genes are the basic directions that “tell” a body how to grow.) Other times, the parent's genes may simply change naturally. Either way, when the child is born, it carries the mutated gene.

In the comic world, most mutants are just ordinary kids when they're born. When they become teenagers their strange powers appear.

Naturally, the sudden appearance of these powers creates problems for the young mutants. For one thing, they do not know how to control their powers. One might accidentally cause a hurricane to happen on the way to school!

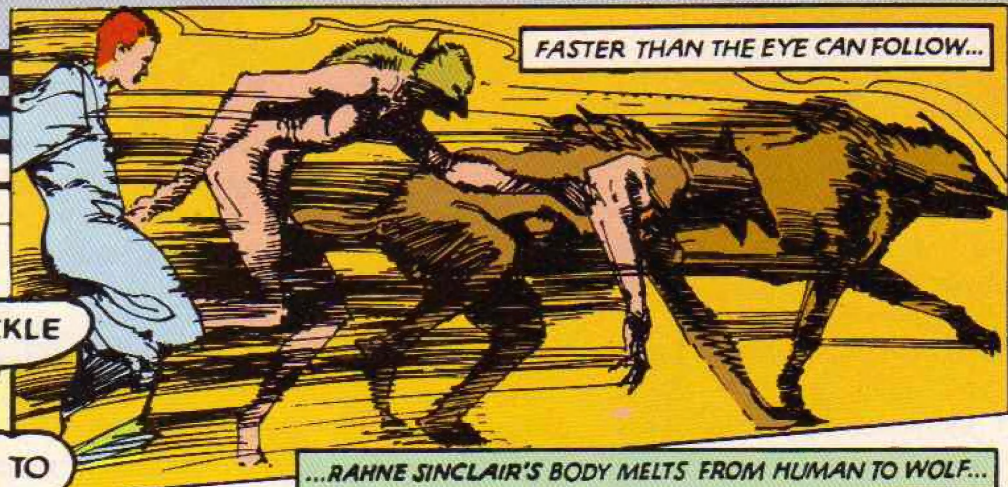
Because ordinary people don't understand

CYCLOPS

NIGHTCRAWLER LIKES TO TACKLE FOES FROM ABOVE -- SO IF I SCYTHE MY BEAM ACROSS THE ENTIRE CEILING...

... I OUGHT TO CATCH HIM JUST AS HE MATERIALIZES.

BINGO!



FASTER THAN THE EYE CAN FOLLOW...

...RAHNE SINCLAIR'S BODY MELTS FROM HUMAN TO WOLF...

WOLFSBANE

KITTY PRYDE

ART BY JOHN ROMITA, JR. AND DAN GREEN

PROFESSOR, I'M IN.

PROFESSOR, I AM.

I SENSE KITTY'S THOUGHTS-- BUT NOT WELL ENOUGH TO COMPREHEND THEM.



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these incredible powers, the mutants' friends and relatives begin to fear them. So they become outcasts and outsiders.

Growing Up Strange

Comic writer Chris Claremont thinks mutant comics are popular with some readers because the readers can identify with the mutants' problems. Mutants are trying to find their places in the world—and that's not always easy. And growing up isn't always easy for kids, either.

Mutant fans seem to agree with Chris. Reader Mark Means, 12, says that "Other superheroes don't seem as real. The X-Men fight for earth's freedom, but they also have to fend for themselves."

Another fan, Joe Davis, 12, thinks mutants are neat because, "They're trying to use their powers to save a world that hates them." And that's a mighty big job for anyone!

Some characters in the comics believe that mutants are actually a different species from the average earthling. They call the mutants "Homo Superior" and predict that mutants will one day use their powers to take over the world.

It's true that some mutants do want to become earth's masters. But most simply want to be accepted by people, and live in peace.

One of the good comic book mutants is Professor Charles Xavier. Long ago he realized that evil mutants were giving the good ones a bad name. So he opened a school for young mutants. He trained them to use their powers for good, before the evil mutants could influence them.

The Professor called his students the "X-Men." Each had an incredible power. Cyclops was the leader. His eyes fired twin red rays that destroyed anything in their path. The Iceman could make snowballs and icicles by freezing the air's moisture. And Marvel Girl moved ➡

objects by concentrating very hard. Together, the X-Men were an unbeatable team.

The Forces of Evil

But comics wouldn't be as interesting if good guys were the only characters. So of course, there are evil mutants as well. The most popular villain is Magneto, the Master of Magnetism. He recruited the bad guys of the mutant world into the Brotherhood of Evil Mutants. Because of villains like Magneto, people in comic books still fear *all* mutants.

Although some original X-Men still appear, a new group of mutants are the stars now.

Nightcrawler looks like a demon, and can teleport through space. Colossus can turn his body to solid steel in a blink of an eye. Storm can create a hurricane just by thinking about it.

But the most popular X-Man is Wolverine. He has razor-sharp metal claws that pop out of his

hands when he defends himself against villains.

Can These Powers Really Happen?

Of course, human mutants with super-powers don't exist. Although many people do have at least one mutated gene in their bodies, that won't give a person huge feathered wings or the ability to fire deadly energy bolts! In fact, nothing on earth could give real people the powers that comic book mutants enjoy. Human bodies simply will never grow wings or metal claws.

But the scientific facts about mutations don't stop the writers of mutant comics from using their imaginations.

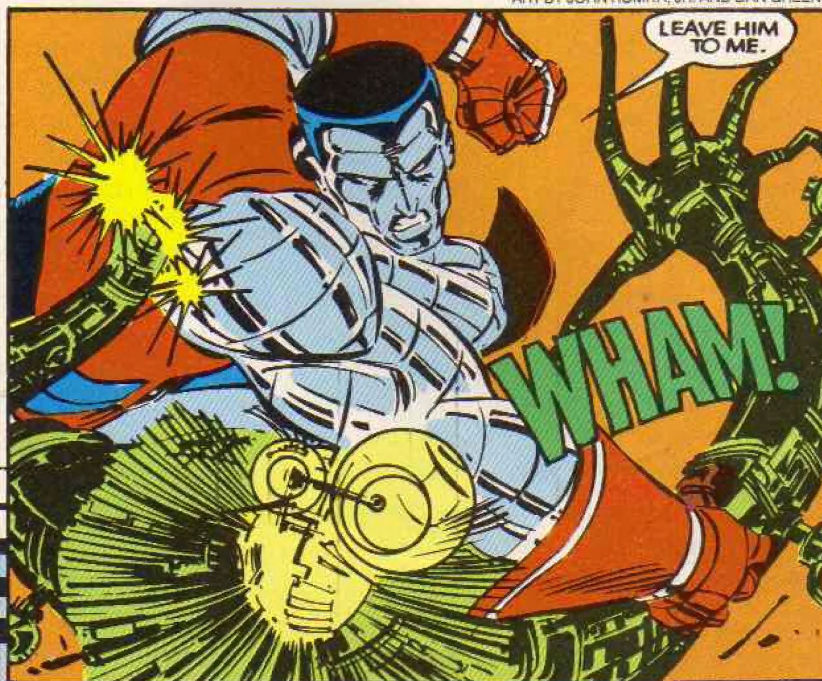
As a matter of fact, the demand for mutant comics is so great that new ones are still appearing. So mutant fans will go on reading about characters with amazing powers that mere mortals can only wish for. And to comic fans everywhere, that's really good news!

ART BY JOHN ROMITA, JR. AND DAN GREEN



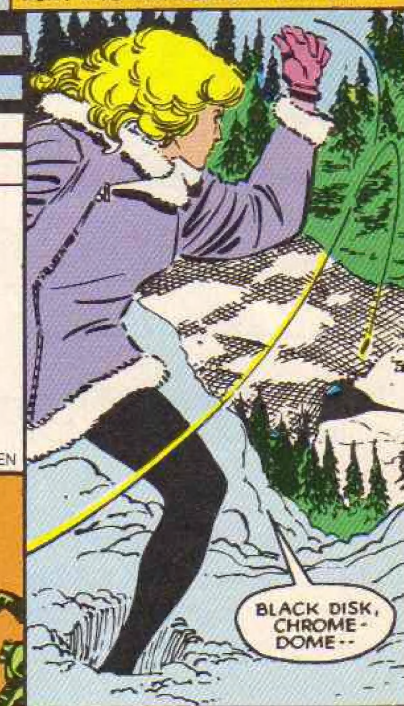
WOLVERINE

ART BY JOHN ROMITA, JR. AND DAN GREEN



COLOSSUS

HOWEVER, RIGHT OUTSIDE, HER PRESENCE MASKED BY A PSISCREEN BUILT INTO HER HELLIONS UNIFORM...



ROULETTE

ART BY JOHN ROMITA, JR. AND DAN GREEN

MUTANTS IN REAL LIFE

by Michele Lyons



PHOTO: BRUCE COLEMAN © DAVID FALCONER

Above: A two-headed snake is a rare natural mutation.

Left: Blue lobsters are mutations that are found once in every 30 million lobsters.

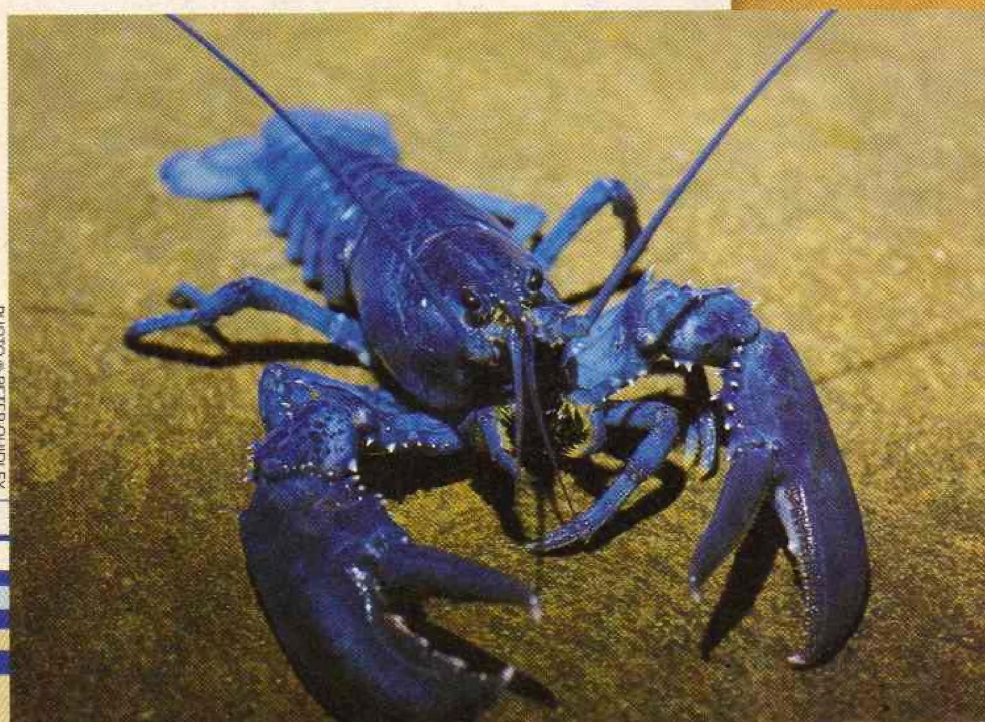


PHOTO © PETER QUIDLEY

It's only in the comic book world of Wolverine and Professor Charles Xavier that mutant genes give people super powers. But in real life, mutant genes do give certain plants and animals some unusual qualities. They have given the world square tomatoes, miniature pigs, and extra-sweet corn. These mutants—and many others—provide people with new and better food.

Mutation in Nature

What's the story behind these real life mutants? Mutation is a natural process. It happens to all kinds of living things. Normally, mutation produces tiny changes. If the changes help that kind of plant or animal to survive, they get passed on from generation to generation over

a long time.

For example, most moths in one area of England used to be white. Then one gene of a moth mutated or changed. This moth produced offspring which were black. At first, there were only a few black moths.

But when factories began to fill the air with black soot and smoke, the white moths were easy to spot by their enemies. So most of them got gobbled up. By and by, almost all the English moths left in this area were black.

Later, however, people cleaned up the air by controlling the smoke that factories put out. As the air got clearer, the black moths became more visible to their enemies than the white ones. Many black moths were eaten up. And more white ones were left to reproduce. Today, most ➡



Above: These carrots were grown in a lab. They were produced by food researchers who are developing new, improved veggies.

of the moths in that area of England are white again. This is how the process of mutation can help creatures to survive in nature.

A Special Breed

But now scientists can sometimes speed up the natural process of mutation for other animals and plants. They can create or copy useful mutations in their labs.

Here's how it works. All plants and animals are made up of cells. Each cell has thousands of genes. Genes contain the basic information that tells the cells how to grow. Genes tell a giraffe to be a giraffe and not a lemon.

But sometimes, for no reason, a gene changes or mutates. It might cause a tomato to look like a square block instead of a round ball.

Below: The peppered moth used to blend in with its surroundings in England.



PHOTO: BRUCE COLEMAN/© KIM TAYLOR

In fact, a few years ago, scientists found a tomato plant that was producing square-shaped tomatoes. These tomatoes wouldn't bruise as easily when they were picked by machines. And they would be easier to pack in boxes to ship to tomato-canning factories.

So scientists wanted to produce more of these square tomatoes. They crossed one of the square tomatoes with a normal-shaped one. The first young tomatoes they got still looked round. But they had a hidden mutated gene for squareness. Then, by breeding these baby tomatoes with each other or their square parent, researchers created many more square-shaped tomatoes.

Of course, square tomatoes wouldn't look good in a salad. So they aren't sold in your market. But they may be hiding in your catsup.



PHOTO: PHOTO RESEARCHERS © MICHAEL TWEDDIE

Above: But when soot from pollution covered the trees, the moth produced black mutants to survive.

Below: Scientists bred this mouse with no hair for research purposes.



PHOTO: PHOTO RESEARCHERS © NIH/SCIENCE SOURCE

Animal Mutants

Scientists can also breed some interesting mutants in the animal world. Miniature pigs as small as cats have been bred for use in lab research. They are easier to keep and cheaper to feed.

Now scientists are also working on the growth genes of cows—hoping to produce one cow that has as much meat as two!

Mutation happens to people, too. And some human mutations do produce changes that are helpful. But, as a rule, mutations in people are harmful.

“Cells in the human body are organized in a very complicated way,” explains a gene scientist at the University of California at Davis. “Expecting to produce a good mutation would be like

crossing two wires from the back of a TV set and hoping it would work better. Most of the time, a mutation in humans—as well as in plants and animals—will make things worse.”

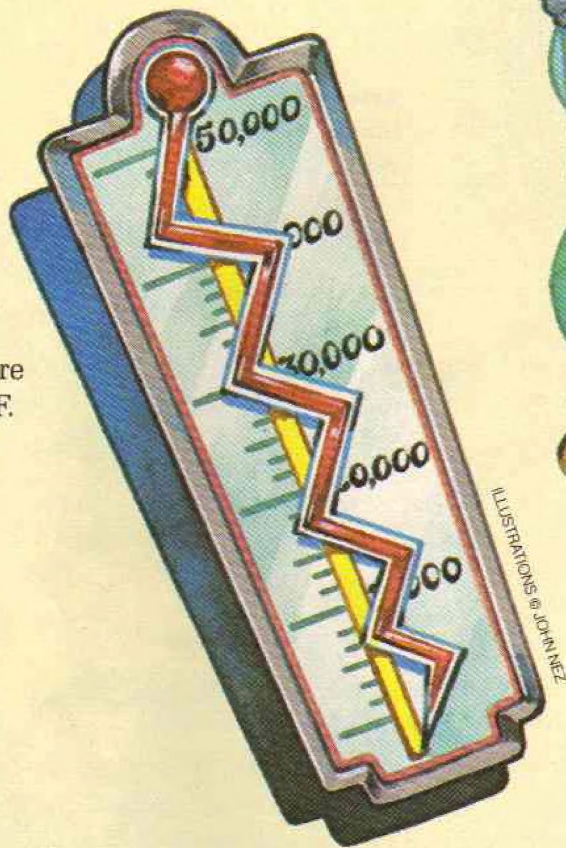
For this reason, scientists don’t experiment to produce mutations in human beings. Most likely, the results would not be good. And even more important, scientists agree that it would be wrong to experiment with human breeding.

Mutants of the Future?

For now, scientists are trying new ways to produce more helpful mutant plants and animals. Who knows? Thanks to science, watermelons may someday be free of seeds. Or roses may grow without thorns. And that’s good news for people, too!

Factoids

A bolt of lightning reaches a temperature of 50,000°F.



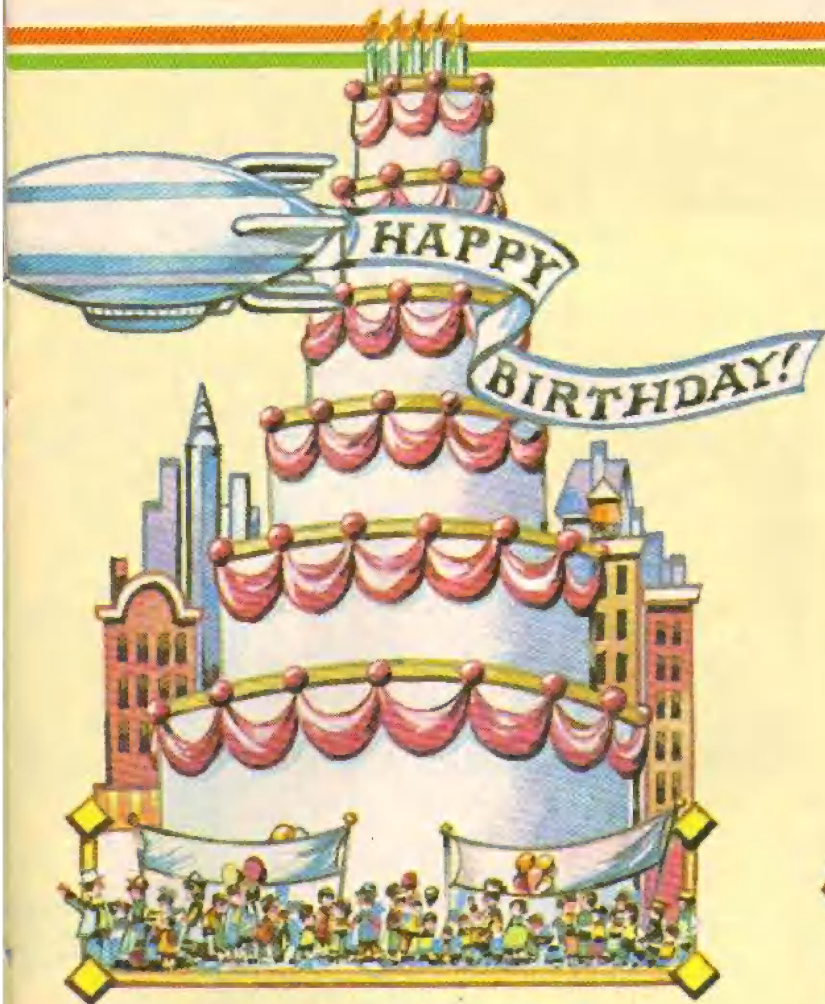
Some 200 million years ago, all the land on earth formed one huge supercontinent.



The first diving suit was a wooden barrel with holes for arms and a window to look through.



There are more than 250 different kinds of apples grown in the U.S.



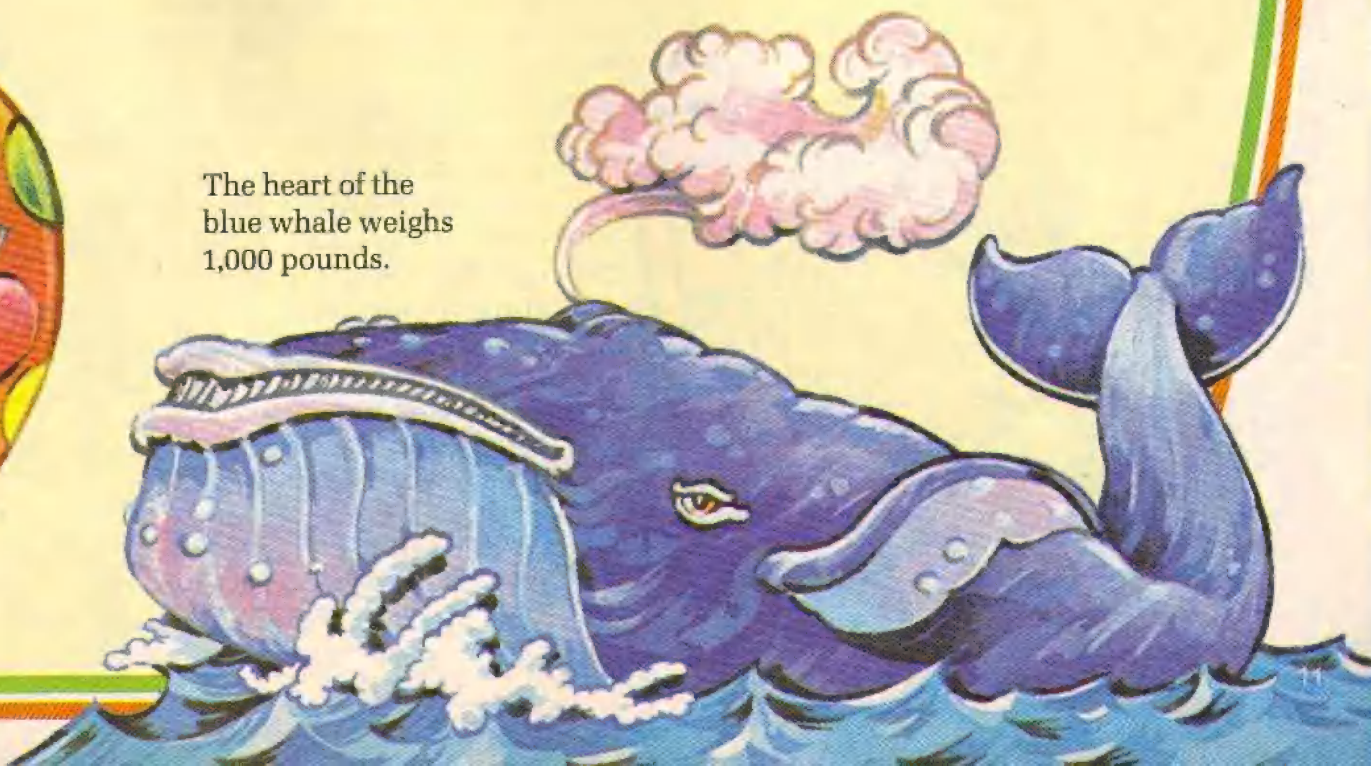
You share your birthday with at least nine million people.



Your body temperature is lowest in the early morning and highest in the late afternoon.



The heart of the blue whale weighs 1,000 pounds.



Any Questions?

by Joel Samberg

Why is the desert the hottest place on earth?

What makes a desert isn't so much how hot it is. It's how dry it is. Places that get less than 10 inches (25.4 cm) of rain (or snow) a year are deserts. But that can be the sizzling hot Sahara of northern Africa or the freezing ice desert of Antarctica.

In the hottest deserts, there are no drops of moisture in the air. That means no rain. It also means no clouds to shield the desert from the sun's rays. Also there isn't much dust or dirt in the air to block the sun. And when the sun's rays reach the ground, there are no trees or grass to absorb the heat. It gets reflected from the bare ground. So everything feels even hotter.

But even the hottest desert can turn cool quickly. The clear, dry air that lets in the sun's heat lets it out just as easily after sundown.

Question sent in by Billie D'Aune Bryant, New Orleans, LA.



Why do you have to get a shot in the arm or in the bottom instead of somewhere else?

There are lots of places you can get a shot. It depends on what the shot is for. It also depends on the kind of medicine the doctor needs to give you and how fast she wants it to work.

Lots of medicines are injected into the layer of tissues right under your skin. The easiest place to give an injection like this is in your arm.

But some medicines might irritate the area under the skin. So the shot is given in muscle—usually the one in your bottom. A doctor might also give you a shot in a muscle if the medicine needs to work fast. Drugs put into muscles travel through the body faster because they can enter many small blood vessels there. The muscle in your bottom is also large, so it's easy to find. It can absorb lots of medicine if you need a large dose.

But whether it's in the arm, bottom, or somewhere else, all shots have two things in common. They may hurt a bit. But they help you get well.

Question sent in by Joanna Hess, San Diego, CA.

Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?
3-2-1 CONTACT
P.O. Box 599
Ridgefield, NJ 07657

Why aren't a duck's feathers wet when it comes out of the water?

water? Some birds don't live in water. So their feathers can get pretty water-soaked in heavy rain. Others have to sit and dry themselves off after diving into the water for food.

But ducks don't just swim around in the water once in a while. Ducks live in water. They sleep in water. They eat in water. They play in water. You get the point. If ducks didn't have some protection against the water, they would get pretty soggy.

So ducks, and other water birds, have a special oily coating on their outer feathers. These waterproof feathers overlay each other so well that they make a coat of protection. This coat protects a duck just as your raincoat protects you during a spring shower.

So when a duck comes out of the water, there's no problem. The wet stuff rolls right off its back.

Question sent in by Anna Jones, Houston, TX.



Why do all radio and TV stations begin with the letter W?

Not all do. If you live east of the Mississippi River, your stations probably do begin with W. But if you live west of the Mississippi, chances are your stations begin with K.

The numbers and letters of a station's name identify the station as your name identifies you. But the first letter or two—or even three—serve a special purpose. They tell anyone—no matter where in the world the signal is picked up—what country the TV or radio broadcast comes from.

Just to prevent a big mix-up, the world's nations decided to split up the alphabet. According to an international agreement, the United States gets to start its TV and radio stations with W's or K's. British stations get the G's and M's. Soviet stations get to use R's. Japanese stations can start with anything from JAA to JSZ, and so on. UC? OK!

Question sent in by Nancy Banffy, Kent, CT.

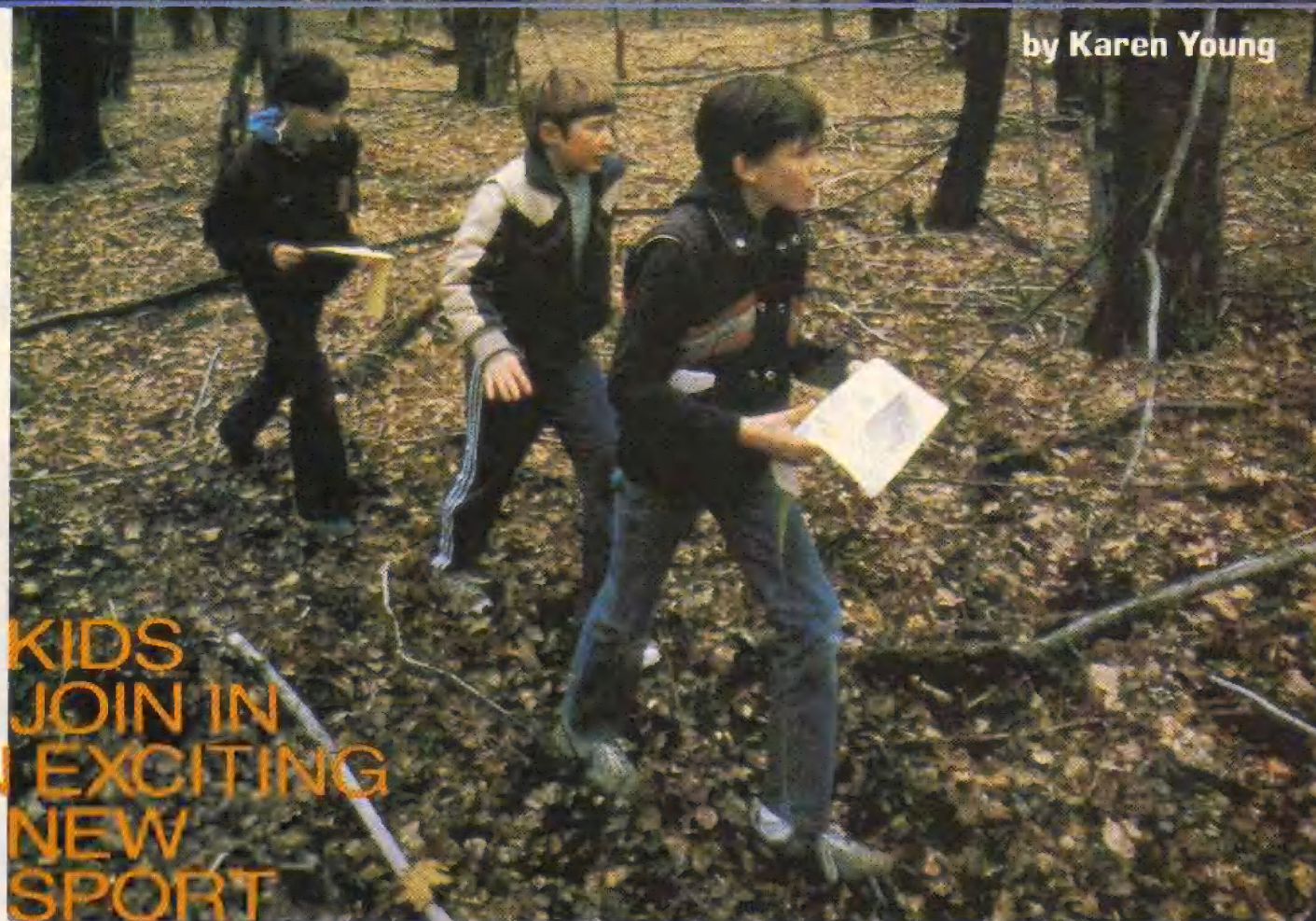


ILLUSTRATIONS © BOB DELBOY



A Race Through the

by Karen Young



KIDS
JOIN IN
AN EXCITING
NEW
SPORT

What's it like to be taken to the middle of a woods and left there to find your way out—in the shortest time possible? All you've got for help are a map and your wits.

If this sounds like fun to you, then you're like thousands of people who are getting into a hot racing sport called *orienteering*. Orienteering clubs are putting on meets that kids and adults are taking part in.

We wanted to know what it's like to go on an orienteering meet. So we asked Karen R. Young to take part—and write all about it!

On Your Mark, Get Set, Go

It's a gray, chilly April morning. I'm standing on a Massachusetts hillside with my hands stuffed in my pockets. BRRRR! How good my nice warm bed would feel right now.

Standing with me are Frank Maniscalco, 11, and his friends John Pearson, 9, and Eric Rose,

11. They are going to lead me through my first orienteering course. We will be racing against other groups of people.

Frank, John, and Eric are all experienced orienteers. I'll be a part of their team.

"Number 45, you have 10 seconds," the meet starter calls.

"That's us!" says Eric. We wait beside the starting point—a boulder covered with moss.

"Three...two...one...Go, 45," calls the starter. And we're off!

We all run to a large map lying on the ground nearby. We quickly copy the locations of six markers—called controls—onto smaller maps which we were given before we started the race. We have to find all six markers.

First, John gives me a quick lesson in map reading. And do I need it! This is no ordinary road map we've got. It's a topographic (top-oh-GRAF-ik) map. It has symbols on it that show

Woods

natural features on the land—like marshes, trees, ponds, hills, and valleys. It also shows objects like buildings, walls, fences, and roads.

To me, the map just looks like squiggly lines and tiny dots. But after John explains the symbols, things begin to make more sense.

The Search Begins

"What are we looking for?" I ask, staring at my copy of the map.

"The first marker is at a stone wall," says Frank. He finds the wall on the map—and a road passing near it. "We can get to the wall by following the road."

We see the road nearby. It is really just a wide path covered by a soft layer of pine needles.

When we get to the wall, a girl from another group, Mary Ellis, 11, is already there. "It's tricky," she calls back to us.

Would Mary give us a little help in finding the marker? "Uh-uh," says John. "That's no fair. We've got to find it ourselves."

Mary was right. We have a hard time finding the marker near the bottom of the wall. We ➡



Above: Mary Ellis checks her map as Karen Young looks over her shoulder—hoping for clues. Karen wears a compass around her neck.



Left: Before the meet, orienteers sign in and get their maps and instructions. Then they're off on a woodland adventure.

PHOTOS © ROBERT RATTNER

need to punch cards we were given with that marker's hole punch to prove we found it.

Soon we're on our way again. We find the next two markers easily. One is between two small hills. The other is behind a barn. But the fourth marker gives us some trouble. We have to find our way across woods and fields.

"I think we're lost," John says after a while.

Eric doesn't think so. "All we have to do is find a cliff around here that's 1.5 meters high. So how high is that?"

"Well, one meter is a little more than three feet," I answer.

"Then it's going to be about five feet high," Frank figures. "That doesn't sound like much of a cliff to me."

Eric runs ahead and climbs up on a log for a better view of the land around us. Suddenly, he spots something.

"I've got it!" he shouts. He leaps down and races through the grass and bushes to a shelf of rocks covered with brush. The orange marker is there on the shelf.

Below: "Where do we go next?" That's the question these kids are trying to figure out as they study their maps.

Which Way to Go?

"Now what do we do?" I ask, looking at my map.

"More rocks," says John. "We have to find a boulder three meters high. We should be able to see the lake when we find it."

Frank races ahead to a large, flat rock.

"This is it," he shouts. But when we get there we don't see the marker and there is no lake.

"Wait a minute," says Frank. "We must be doing something wrong."

"But this is the big rock," Eric argues. "It's three meters long—almost 10 feet."

"Maybe it should be three meters high..." I look around. Above us, six turkey vultures soar and circle on a draft of wind. If I could only see the woods from their viewpoint. Then it would be easy to spot a big rock.

Then I realize that's just what my map gives me—a bird's-eye view. I look at my map again. Those squiggly lines near the boulder mean it is on a hillside, not the flat land where we are standing. To the right of me, the land slopes up toward a grove of trees. And behind the trees...is a tall boulder!

We check it out. Sure enough, the control is there, too. We punch our cards with the hole





ished the white course—the beginner's course in orienteering. There are five other levels: yellow, orange, green, red, and blue. Each one is more difficult than the last.

"When you're out there it sometimes seems hard and scary," says 14-year-old orienteer Jeff Schafermeyer. "But once you're finished, you feel really good."

I leaned back against the rock and gazed at the lake below. Hmmm...Maybe I'll try the yellow course next....

Below: Eric, John, and Frank Maniscalco race to the finish line. They've successfully made their way out of the woods.

Above: Eric Rose and John Pearson just found their marker—a 10-foot-high rock. They used the orange punch that's tied to a tree to prove they "hit the spot."

punch on the rock. We've lost valuable time by using our eyes—without checking our maps.

To the Finish Line

According to our map, control six is on top of a small hill high above the lake.

After punching our cards one last time, it's an easy jog through tall grass to the finish line.

"Come and check in," John calls to me. Oops, I nearly forgot. The people at the finish have to jot down my time. If you don't check in, they send someone out to look for you.

"Whew!" I flop down to rest on a big rock. Mary is already there, with one sneaker off, rubbing her foot. I'm worn out and my thumb is bleeding where I caught it on a thorn. But I'm not cold anymore—and I made it! I fin-



PHOTOS © ROBERT RATTNER

TREASURE

The Tallville police chief was stumped. He hoped that Inspector Usself, an ace detective, would help him solve his case.

"Yesterday, that dastardly desperado, Dangerous Doug Dagger, broke into Crown's Jewelry Store, stealing all of Crown's jewels," the chief told the Inspector. "Fortunately, Dangerous Doug was caught within the hour. Unfortunately, an hour was all the time Dangerous Doug needed to bury the jewels."

"When we booked Dangerous Doug, we found a map and a mysterious note that he tried to pass to a friend. We believe that the note can lead us to the missing jewels." Inspector Usself read the note:

1. To find the jewels, start at the NW corner of the map. Travel $1\frac{1}{2}$ miles S to the highest point on

— — — — — — Mountain.

2. Then, go SE to the "Y" of Hubert and — — — — — — Road.

3. Follow the road to the cemetery. Then go SE to — — — — — — — Mountain, the highest point on the map.

4. Head $\frac{1}{2}$ mile NE and you can cross the — — — — — — — without getting your feet wet.

5. Follow the trail S for $\frac{1}{2}$ mile, then go due E to — — — — — Lake.

6. Now scale the highest mountain E of Dudson River, and you should be able to see — — — — — — — —

— — — — — to the NE. Go NE. There you'll find the jewels.

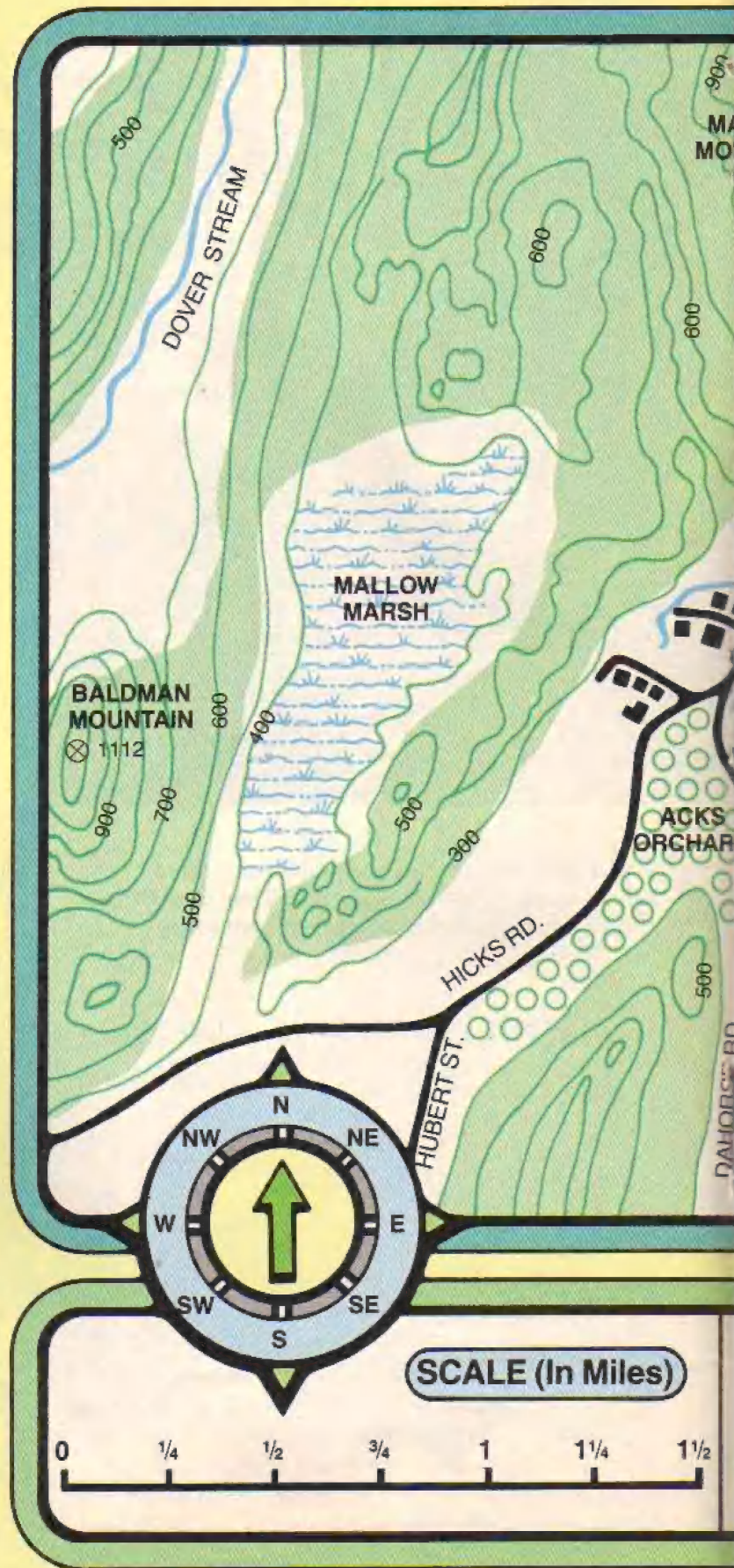
Can you help Inspector Usself find the jewels? Follow the clues in the note, then write in the locations. The letters in the boxes spell out the correct spot to dig.

"We've been digging where the note says," the Chief said. "So far, nothing."

The Inspector looked at the map, then read the note one more time. A smile crossed his face when he solved the code.

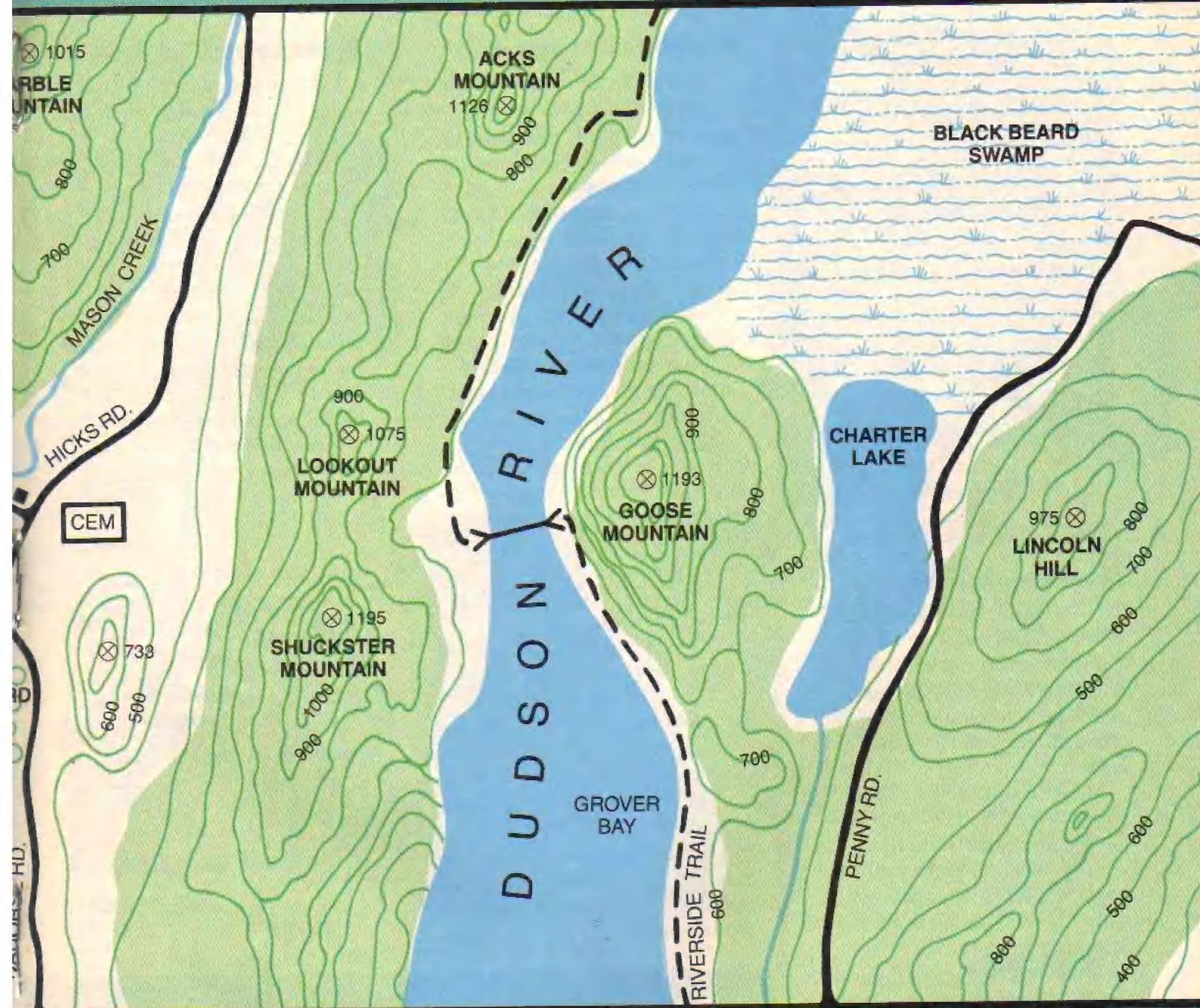
"You'll get nothing but mosquito bites where you're looking," he said. "If you want to find those jewels, you must look in

— — — — —."



HUNT

by Michael J. Dayton



HILL

HIGHEST POINT

ELEVATION (In Feet)

MAP KEY

CEMETERY

CEM

WOODS

BUILDINGS



ORCHARD



ROAD

TRAIL

FOOTBRIDGE



Coming Attractions



ILLUSTRATION © PHIL ANDERSON

Fantastic Voyage

Around the world in 14 days? No big deal in that. After all, the space shuttle can make the trip in just 90 minutes. But for scientists, airplane fans, and energy watchers, an upcoming 14-day flight is a big deal!

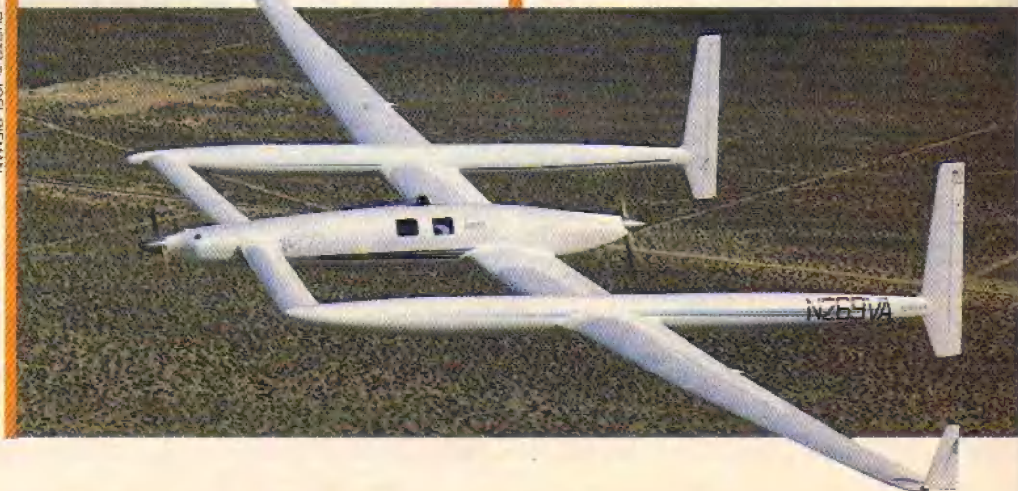
The flight will be made by the Voyager, a super-light plane. It will make the 25,000-mile trip without refueling! (A passenger jet must refuel at least twice.) Scientists are interested in lightweight planes because they use less fuel than heavier ones.

Specially designed for its trip, the weird-looking Voyager is made of lightweight materials that are as strong as steel. Its body is made of fiberglass, foam, and the kinds of fibers used in bulletproof vests.

The plane has two pairs of wings. One pair is attached to its nose and the other is halfway down its body. Voyager also has propellers in front and in back.

Voyager could pave the way for more advanced planes that can make long distance flights on small amounts of fuel. And that can be important in a future world where fuels may be in short supply.

PHOTO © JOEL RIEMAN



Invention of the Month

Criminals in the future may serve jail sentences at home, thanks to a new invention.

A short-range radio transmitter is attached to the criminal. A receiver in the home picks up a continuous signal. Police are alerted if the prisoner goes out of range of the receiver.

Right now, New Mexico is using the invention on people found guilty of drunk driving. The device is a band that is locked on to a person so that it is impossible to remove.



ILLUSTRATION © MARTI SHCHET

Message to Mars

How would you like to send a message to Mars? According to a company called SpaceShot, you can. It lets you send 25-word messages and pictures to distant planets, stars, and galaxies—for a price.

Here's how it works: Your message is stored in the SpaceShot computer. At sending time, it is fed to a radio dish pointed toward the planet or galaxy of your choice. Then it is sent to deepest space.

Most people believe that earthlings will never receive a reply from their messages into space. But even so, some people are willing to pay to send them.

If you could send a message to a galaxy or planet, what would it be—in 25 words or less? Send us your messages. We'll print some of them in a future issue. Of course, we can't guarantee that there are any life forms who will receive your greetings!

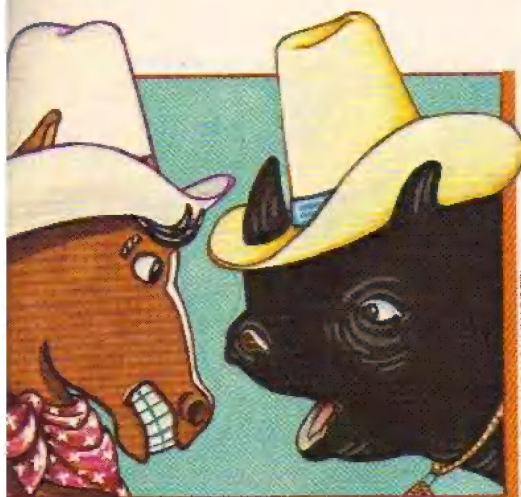


ILLUSTRATION © PAT CLIMMINGS

Home on the Range

Texas is famous for its cattle, its oil, and J.R. Ewing. In the future it may be famous for something else: a herd of black rhinoceroses. Over the next 20 years, a total of 200 black rhinos from east, south, and central Africa will be sent to two ranches in Texas.

The rhinos are coming as part of an effort to save these animals from dying out. Rhinos breed very slowly. It takes 17 to 18 months for a rhino calf to be born. And right now, illegal hunters are killing off the rhinos faster than the animals can reproduce.

"The rhino's feeding habits make it ideal for Texas ranch life," says Elvie Turner, one of the people responsible for bringing the animals to Texas. They graze on grassland, and are well-suited to the Texas climate.

How do people get the rhinos to Texas anyway? By airplane. But first officials use a tranquilizer gun to calm the rhinos down. "You have to," explains Harry Tennison, a cattle rancher. "You can't throw a lasso around one unless the rope is made of two-inch steel. I sure wouldn't want to do it!" he adds.

Robots at Work—More Time for Play

According to a well-known robot expert, robots will give humans more time for fun in the future. "A shorter work week of 20 hours may be possible," says James Albus.

Mr. Albus thinks that robots may also increase employment. Not everyone agrees with Mr. Albus. Many people say robots might put more people out of work. Only time will tell.



ILLUSTRATION © BARBARA HAMLIN

Watch, Rock and Roll

You've probably seen jukeboxes—and you've probably played your favorite rock songs on them. But now there's a new twist in jukes: video jukeboxes.

The new type of jukebox looks pretty ordinary. But attached to the top of it is a 25-inch TV screen. Inside is a central computer and a pair of VCRs which combine the record of your choice with a rock video.

These video jukeboxes are expected to start taking the place of the "old" jukeboxes in the next few months.



COURTESY OF BROOKHAVEN NATIONAL LABORATORY

Flower Tales

Will flowers and plants be used to detect pollution in the future? They may, if some scientists at the Brookhaven National Laboratory have their way.

Right now, scientists there are using a plant that turns from blue to pink if there is much pollution in the air. The plant is called *Tradescantia*. It may be used to help detect whether radiation is leaking from nuclear power plants.

So What's New?

You tell us and you'll get a nifty CONTACT T-shirt—if we print your story. Send us any science stories that have to do with the future (which could even be next week!). Send stories to:

Coming Attractions
P.O. Box 599
Ridgefield, NJ 07657



PHOTO © JONNY WOODS

Left: As a future animal doctor, Susan Prattis is learning to examine sick pets very carefully. She looks for clues about how to make them well.

VETS TO THE RESCUE

by Joanna Foley

Every day when Susan Prattis enters her school building, doctors and nurses rush past her down long hallways. Over the loudspeaker comes a voice: "Dr. Schwartzman, to the intensive care unit."

Susan's school doesn't look like an ordinary school. Instead it looks like a big modern hospital. And that's exactly what it is! But it's a hospital with a difference. Some patients are barking in the waiting room. Another patient's shoes are made of iron. And the oxygen tent in the emergency room is really an oxygen cage. This hospital is for the birds—and the horses, the dogs, and every other type of animal.

Susan Prattis is a student at the University of Pennsylvania Veterinary School in Philadelphia. Here she and other future animal doctors learn to use the latest in high-tech equipment to help treat sick animals. For instance, if an ani-

High-Tech Medicine Mixed With Loving Care

mal is lame or has a wound, vets can use a laser gun to "shoot" powerful beams of light into the area to help heal it.

How do you lift an injured horse? With a hoist! Vets lift horses after operations so that they can be placed in a rubber raft and floated in a pool. This helps horses to recover by taking the weight off their injuries.

There are also air drills to set broken bones, EKG machines to monitor heart beats, and even a device that measures the stress on a race horse's leg. But modern animal doctoring involves more than just using high-tech equipment. So Susan gets plenty of practice examining sick animals and giving them lots of tender, loving care.



Left: A laser gun treatment will help this injured horse walk more easily. Lasers are often used to help horses recover from wounds or being lame.



PHOTOS © CONTACT PRESS IMAGES/LOUIE PSIHOVOS

It's a Dog's Life

On the day that 3-2-1 *CONTACT* went to visit Susan in Philadelphia, she was rushing to meet her next patient. But first she stopped to brush off her white coat after working with a dog named Rico. Just as she had gone to give him his medicine, he went for her! Luckily, his jaws closed on the air instead.

"So far, I've never been hurt by a patient," she smiled with relief. "But sometimes you have to move real fast."

Susan walked to the waiting room to meet Samson. Glancing over the medical records from the dog's regular vet, she said, "He has had a skin problem for months. And it's getting worse." ➡➡

Left: This owl keeps an "eagle eye" on a vet who is removing his stitches. The bird had an operation to repair a broken wing.

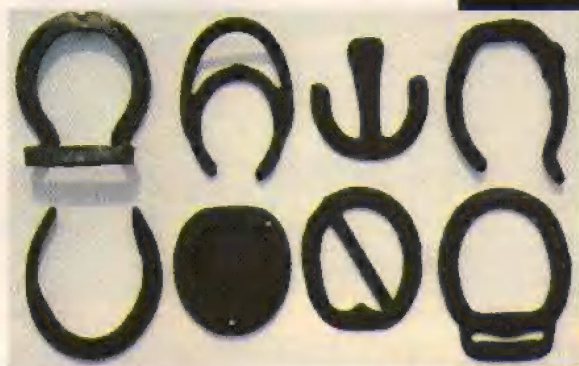
Susan greets Mr. and Mrs. Rossi, Samson's owners. Then she leads the Doberman back to be weighed. The scales are level with the floor so animals won't fear them. Samson walks onto the blue scales. A digital readout flashes red numbers on the wall: 101.5 pounds!

In the examining room, Susan and Mr. Rossi have to team up to get Samson onto a table where she will check him over. The dog starts shaking as he stands on the metal table.

"Good boy," Susan murmurs, patting him. "Nice fellow." Soon Samson settles down. Susan checks his eyes, his ears, and his mouth. She listens to his heart and lungs with her stethoscope. Then she questions the Rossis about Samson's symptoms.

Soon Susan is fairly sure she knows what's

Right: Even a modern vet school needs a blacksmith to make horseshoes. He uses X-rays to design special shoes for horses with unusual problems.



wrong. But because she is still a student, she must discuss the case with her teacher, Dr. Schwartzman. He agrees that Samson seems to have a thyroid gland problem.

"Many Dobermans have the same problems as your dog," he tells the Rossis as he makes a quick check of Samson.

Then it's time for Susan to take the dog to the lab and give him a blood test. The result will tell for sure whether Samson needs thyroid medicine.

Soon the big Doberman is trotting out the hospital's front door. The Rossis are feeling much better. They know their pet is getting good help.

A Tortoise on a Skateboard

Sometimes the patients that come to this animal hospital are more unusual than Samson. There was a 400-pound tortoise with a broken leg. Vets set the fracture, then gave their patient

a skateboard to get around on while it recovered.

Felix Vega, one of Susan's classmates, remembers treating a bobcat in the emergency room. A man was keeping this wild creature as a pet. When it started vomiting, it was brought in for help.

"The bobcat really hissed at us," says Felix. "So we had to handle it with a squeeze cage." That's a cage with one wall that can be moved in towards the front. We put upset animals in there—so they can't hurt themselves—or us!"

Other unusual animal patients benefit from the vet school's close connection with hospitals that serve people. A sick baby orangutan from the Philadelphia zoo got a checkup at the Children's Hospital of Philadelphia, for instance.

A cat that was very ill with diabetes was once brought to the animal hospital. It was saved when the vets rushed across the street to the hospital for people to get the right medicine.

Animal Medicine and Human Medicine

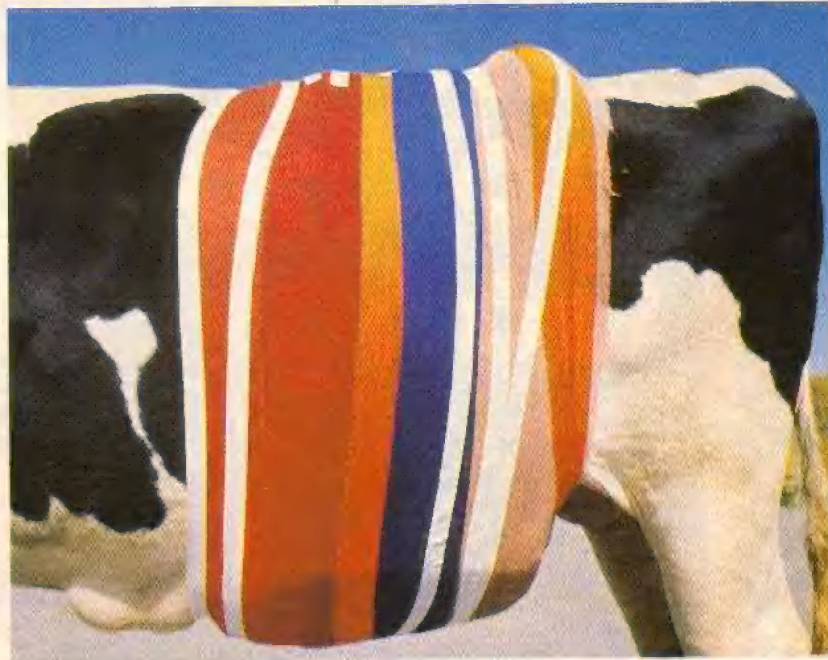
Susan isn't sure just what she wants to do when she graduates from vet school next month. She may become a vet who does lots of operations.

But most of all, someday Susan hopes to do medical research that will help sick *people* as well as sick animals. "Today there are more crossovers between animal medicine and human medicine than ever before," she says.

Sometimes vets do research on animals with cancer. They may learn new things that can help doctors take better care of humans with cancer.

Animals get heart disease, too. Pacemakers—devices that help with heart trouble—were first tested on animals before being used on people. And now the use of these pacemakers has come full circle. For the first time, a pacemaker is helping a sick horse at the vet school.

Whatever the future holds for Susan, she will bring the latest veterinary training to the pets that will be her future patients. Long ago, she decided to become a vet because of her love for her childhood pet, a Labrador Retriever named Whiskers. Today, Susan still thinks concern for sick animals is the most important quality a vet can have. At check up time, a droopy dog or a 'fraidy cat couldn't ask for more.



Above: Farm animals get treated at a different part of the University of Pennsylvania Vet School. They're taken care of at a large farm outside Philadelphia. There, a cow wears a bandage while getting over an operation.

Below: A rubber raft floating in a pool keeps a horse from hurting itself while it recovers from surgery.



The Bloodhound Gang



ILLUSTRATION © BRAD HAMANN

The Mystery of the Marsh Monster

by Michael J. Dayton

The Bloodhound Gang sat in their office, staring at their telephone. No matter how hard they stared, it refused to ring.

"Boy, the detective business is slower than a snail race," complained Vikki.

"We should go see a movie," suggested Ricardo. "'Attack of the Killer Tomatoes' is on."

"I had those for lunch," remarked Skip, who was doing the word scramble from the newspaper. "Say, can anyone make a word from 'ryhnug'?"

Suddenly, the door sprang open. The Bloodhound Gang was surprised to see their friend Everest Mint enter the office.

Everest surveyed the Gang and laughed. "You three look like sugar maples in spring—com-

pletely sapped. You need to get outside and pump a little fresh air into those lungs."

"What did you have in mind?" Vikki said.

"The State Orienteering Championships are this weekend," he said. "I could use some teammates to win it."

"What would we be doing?" Ricardo asked.

"Oh, slopping through mud, crawling through briar patches, scaring snakes—nothing but fun things," he answered. "Skip? How about you?"

"Ghrnyu?" muttered Skip.

"Good, I knew I could count on you," he replied. "Meet me at one o'clock at Piano Mountain." Everest headed toward the door.

"Oh, by the way, I hope monsters don't scare

you. There's this crazy rumor going around. Seems some campers sighted a marsh monster near Eremite Swamp. They said it looked like a cross between a bear and a lizard."

"I'd be cross too if I looked like that," Ricardo said.

"It's called Big Mouth because it screams a lot or something," Everest added. "But like I said, it's probably just a crazy story."

Everest left, slamming the door behind him.

"Gee, I sure hope we're not attacked by any killer tomatoes," laughed Ricardo.

The Meet Begins

"Attention, everybody," said a contest official as he handed topographic maps, compasses, and clues to each of the 30 contestants. "Here's how the contest works. Somewhere in the woods, we've hidden six markers. Your clue tells you where to find the first one.

"At each marker, you'll find compass directions to the next marker. Also, at each marker there is a letter such as 'A' or 'B'. Write those letters down. When you have all six letters, unscramble them to spell a word. The first team to finish and unscramble the letters wins," the official said.

Then he frowned slightly. "Also, I know some of you have heard stories about some... monster... living near the swamp. That's all they are—stories."

From somewhere deep in the woods echoed a piercing howl, half-human, half-animal. A shudder swept through the crowd.

"There's no reason to be afraid," said the official, glancing over his shoulder. "Ready? On your mark. Get set. Go!"

Half the contestants headed into the woods. The other half, persuaded by the strange howl they heard, turned in their maps and left.

"C'mon, there's nothing to be afraid of," Everest said. His voice was not convincing.

Everest unfolded his map. Then he studied the clue. It said:

**MARKER ONE / W 7000 FT
1/2" N P in Piano Mountain**

"How will we ever find that?" Ricardo asked.

"It's simple really," Everest explained. "We locate west using my compass, then step off

about 7,000 feet. To find a more exact location, I use the ruler on my compass and measure 1/2" from the 'P' in the word 'Piano' that's printed here on my map."

"Don't you worry about getting lost?" inquired Skip.

"Not when I have a compass," Everest said. "It's as handy today as when it was invented more than 4,000 years ago. Of course, mine is a little fancier. Back then, a compass was nothing but a magnetic rock floating on a piece of straw or wood."

"So now we just head in a straight line to the marker, right?" Vikki said.

"Wrong," Everest said. "This is where the topographic map comes in handy. You might think the shortest route would be the quickest. But look how close the contour lines are on the straight route. If we go that way, we'll have to climb a steep cliff. We'd be better off following Hunter's Brook, then heading north."

They followed the route from marker to marker. Under Everest's guidance, they found four markers within two hours.

The fifth marker was near the top of Piano Mountain, where they found the letter 'C'. So far, they had 'E', 'C', 'A', 'S', and 'S'. After the long climb, they stopped for a short rest under a large spruce tree.

"It sure is peaceful up here," Vikki said. "I could stay here forever. It's so quiet."

A loud screech sliced through the silence.

"What was that?" exclaimed Ricardo.

"It was the same noise we heard earlier—only a lot closer!" Skip said.

"It's Big Mouth!" exclaimed Everest.

"There's no such thing as Big Mouth," Vikki assured him.

"That's a relief," sighed Everest, "because the next marker takes us right by the swamp!"

Swamp Tricks

The Bloodhound Gang and Everest edged nervously along the swamp. Thick vines made the going slow.

"Let's find that marker quick," said Ricardo.

"This place gives me the creeps."

"L-look!" Skip exclaimed.

Bubbles were rising from the swamp. Slowly a shape, half-bear, half-lizard, surfaced.

"It's Big Mouth—run!" Everest yelled. He took off like a gunshot, followed closely by Ricardo and Skip. They raced nearly half a mile before stopping.

Skip strained to catch his breath. "Where's Vikki? She's not with us!"

"She's still back there," groaned Ricardo.

"We've got to go back and help her."

"Go back? Are you crazy?" said Everest.

"This is the spot where it came out of the water," Ricardo said as they retraced their steps.

"But there's no sign of Vikki."

"Two sets of tracks go up this way," noted Skip. "These look like Vikki's tracks." They examined both sets of tracks.

"That's strange. I've never heard of a monster wearing fishing boots," Ricardo said. "Someone has pulled a monster of a trick on us."

"Something else around here is strange, too," Everest said. "The needle of my compass is acting crazy."

The compass needle swung back and forth as Everest walked near the swamp.

Skip thought for a moment. "A compass will sometimes act that way around a very strong electrical current. There must be an underground power line here."

"I've got a feeling that this cable can lead us right to our monster—and Vikki," Ricardo said. "Let's follow it with the compass."

The trio walked through the woods, watching the compass needle carefully. When they were over the cable, the needle swung back and forth. The needle returned to magnetic north when they strayed away from the cable.

"There's a small stone house," Ricardo said.

Through a thick grove of pine trees, a small cottage was barely visible.

Skip sniffed at the air. "I smell something cooking," Skip said. "It smells like..."

"...like fresh trout," said a tall, gray-haired man with glasses standing before them. With him was Vikki.

Big Mouth Uncovered

"Vikki! You're alive!" Ricardo said, giving her a hug.

"Of course," she replied.

"What happened to Big Mouth?" Everest asked.

"You saw me, Joe Oberhill, dressed in my clever costume," the man said.

"So you're Big Mouth?" Ricardo asked.

"Yes," explained Joe. "You see, I love two things in life: Trout fishing and privacy. Well, the trout fishing around here is excellent. And what spot could be more private? So, I bought this land a few years ago and built this house."

"Unfortunately, some teenagers discovered my hideaway. They started breaking in while I was gone. One time, I caught them inside, and scared the daylight out of them. I got a big kick out of that."

"So then you decided to scare people a little more professionally," Skip said.

"But Vikki, how did you know he wasn't a monster?" Ricardo asked.

"That was easy," she answered. "Most monsters don't wear glasses. Joe wore his under his mask. When he turned his head, the sunlight gleamed off them."

"Well," sighed Everest. "The mystery of Big Mouth is solved. But we'll never win that orienteering contest now."

"Oh, I think you will," laughed Joe, holding up a big 'L'. "I didn't realize what this was, so I took it down."

"So the word is 'scales'," Vikki said.

Skip's eyes lighted up. "Hungry!" he exclaimed. "That's the answer!"

"You're always hungry," remarked Ricardo.

"No, that's the answer to that jumble I've had in my head all day."

"Speaking of hungry, I've got some trout cooking right now," Joe said. "Let's eat lunch."

Joe led them into the cottage.

"Well for once I'm glad I opened my big mouth," Skip said.

COMING NEXT MONTH

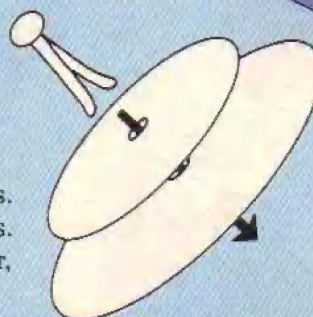
The Mystery of the Missing Sword

Compass Code Machine

You've read all about orienteering and how kids make their way out of the woods. One sure way is to use a compass. You can use it to send and receive secret messages from your friends. There are four different code combinations so you can stump even your brainiest friends.

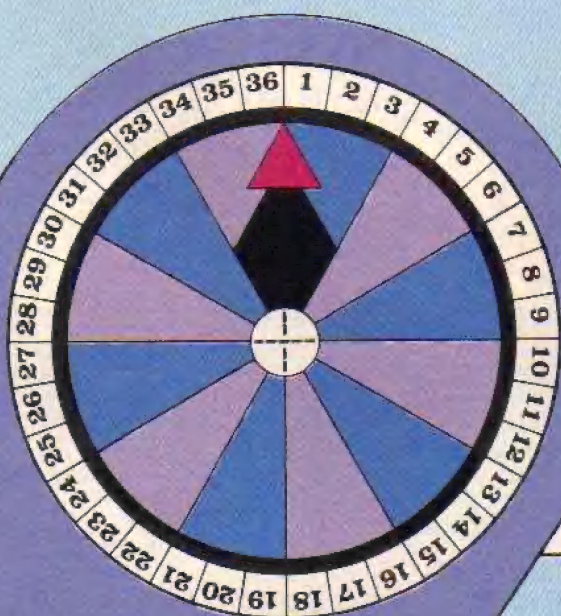
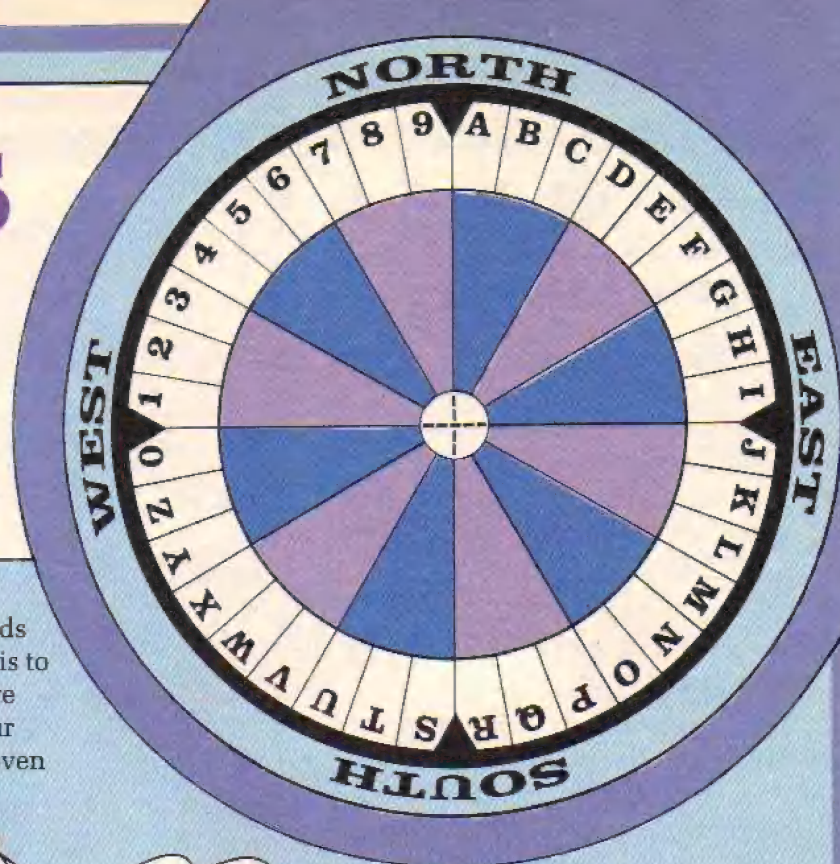
How to Make the Compass:

1. Cut out the two circles on this page. If you don't want to cut up the magazine, trace these circles on separate paper.
2. Paste the two circles on two pieces of cardboard—each the same size as the circles.
3. Punch a hole in the center of both circles.
4. Connect the circles with a paper fastener, so that both turn easily. (See drawing.) The smaller circle should be on top of the larger one.



How It Works:

1. Turn the top circle so that the red arrow points to one of the four direction arrows—North, East, South or West.
2. The numbers on the smaller circle should line up with a letter or number on the larger circle.
3. The numbers on the smaller circle are the code. To find the message, write down the letter or number on the big circle which is above the number on the little circle.



Riddle: (Direction: West)

CODE (on smaller circle)

32	17	10	29	17	24	21	13	28	
29	17	14	32	24	27	21	13		
11	30	29	15	18	29	28	18	23	
34	24	30	27	25	24	12	20	14	29?

Answer: (Direction: South)

19 31 19 34

(See page 35 for the decoded message.)

Now try coming up with your own neat codes and messages. You can choose any of the four directions for four different codes. This will give you loads of ways to pass on secrets to your friends.

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Extra!

by Ellen R. Mednick

We've got some colossal surprises still in store for you! So get ready for more fun and games in this month's EXTRA!



Superhero Search

You may not have the powers of Colossus, Karma, or the other mutants you read about. But here's a word search that will test your superpowers to uncover hidden words. Try finding these super-doooper characters on our list. The leftover letters spell out the names of three other superheroes. For the answer, check out page 35.

CYCLOPS	PSYCHE
MAGNETO	CANNONBALL
COLOSSUS	SUNSPOT
STORM	WOLFSBANE
ROGUE	ILLYANA
WOLVERINE	ICEMAN

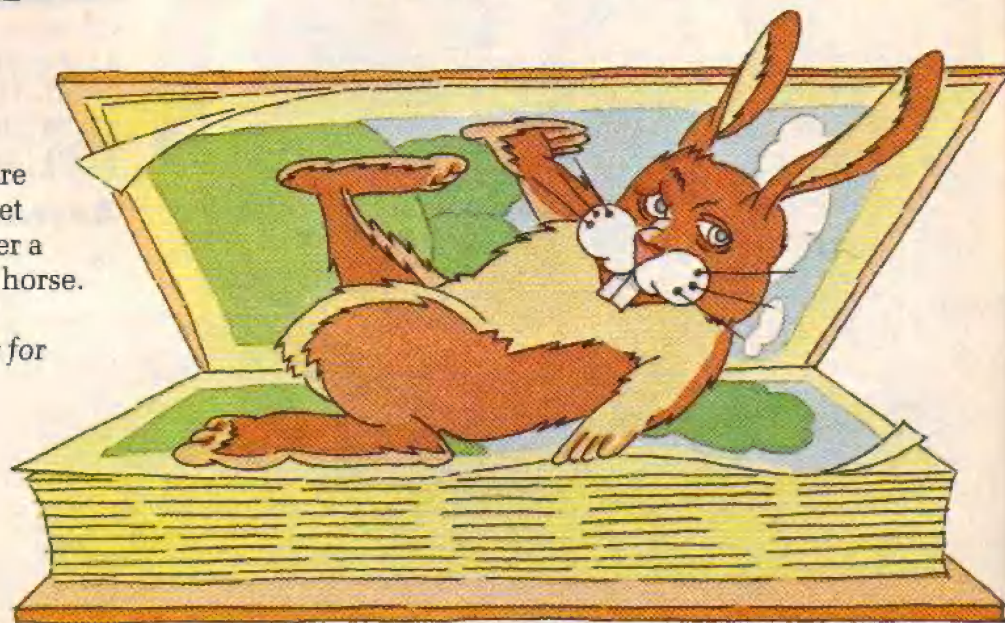
C O L O S S U S S S P
Y A E P S Y C H E U E
C I N I D E R M M N A
L L A N N A M A I S N
O L B D O W G R O P N
P Y S D E N E R O O W
S A F O E V B U M T A
N N L T L A N A G D S
S A O O U P E R L O M
A N W I C E M A N L R

Pet Marks

Here's how you can learn to care for your pet. Just send for some pet bookmarks. Each one shows either a dog, cat, fish, parakeet, rabbit, or horse. And each has care instructions.

You'll have to send three cents for each bookmark you'd like to:

Pet Bookmarks, #HE721
The American Humane
Association
P.O. Box 2788
Denver, CO 80201.





Math Wiz

Here's a math trick that will make your friends think you're a superhero filled with brain power. Tell them that you can guess their age—and the exact month and day of their birth.

Here's how: Have your friends write down the month and day of their birthday in number form. (If he or she was born on April 8th, they would write 408, not 48.) Let's say your friend is 11 and was born on September 5th. Give them the following instructions:

Month and day of birth	905
Multiply by 2	$\times 2$
	1810
Add 5	$+ 5$
	1815
Multiply by 50	$\times 50$
	90750
Add age in years	$+ 11$
	90761
Add 365	$+ 365$
	91126
Subtract 615	$- 615$
	90511

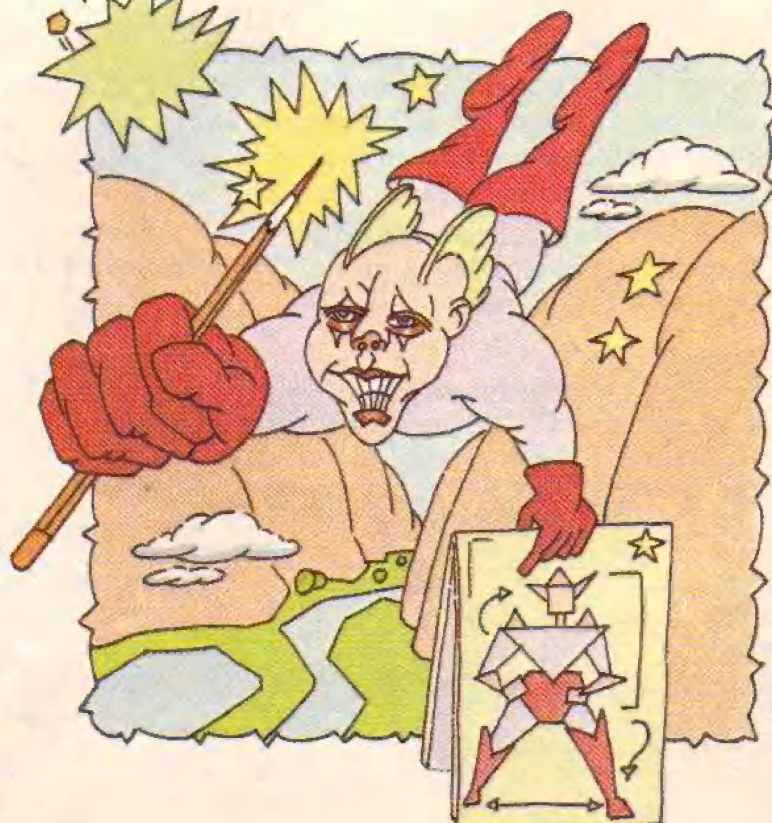
Math magic! 9 for September, 05 for the 5th, and 11 for the age.



"Marvel"—ously Clever Contest!

We'd like you to come up with your own mutant or superhero. Draw a picture of the character and tell us a little about him, her (or it!). You might want to tell how they got their super powers, and how they use them. The people at Marvel Comics will choose the winner. And the best entry will appear in a future issue of *The New Mutants*. Send all your entries by July 1, 1985 to: **Comic Contest**

3-2-1 CONTACT
One Lincoln Plaza
New York, NY 10023



ILLUSTRATIONS © MICHAEL DONATO

Extra!

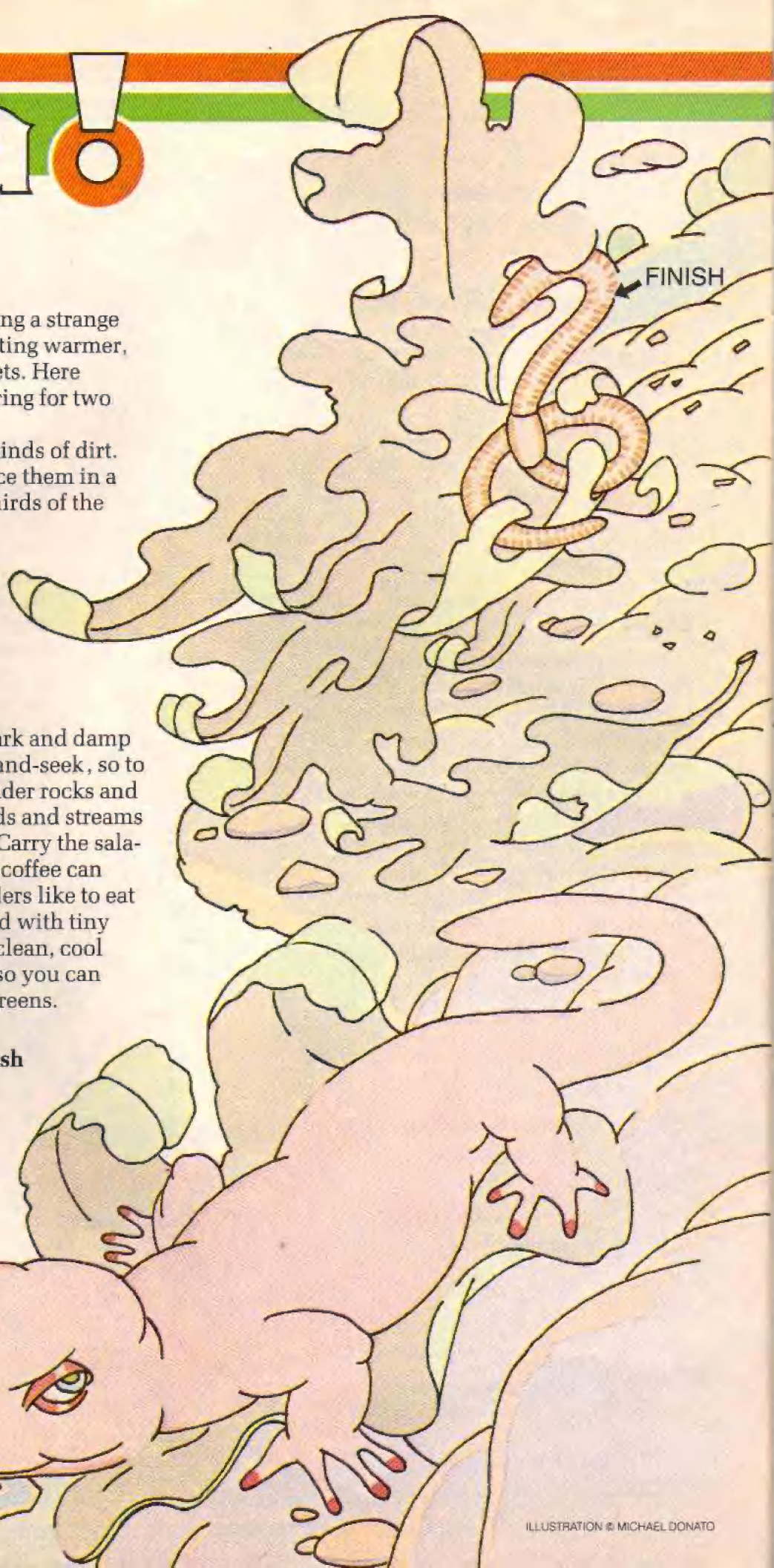
Fabulous Pets

Did you ever think about having a strange pet? Now that the weather is getting warmer, you can go outside to look for pets. Here are a few tips for finding and caring for two unusual animals.

Earthworms are found in all kinds of dirt. Dig the worms up carefully. Place them in a pan or wooden box filled two-thirds of the way with damp soil and leaves. Cover the top of the pan loosely with plastic or a piece of cloth. Earthworms will gladly eat cornmeal, breadcrumbs, cooked vegetables, and even leaves. Keep them in a cool, shady place.

Salamanders like to live in dark and damp places. They love playing hide-and-seek, so to find them you'll have to look under rocks and logs. But most are found in ponds and streams in the early spring and late fall. Carry the salamanders home inside an empty coffee can sprinkled with water. Salamanders like to eat small insects and can be tempted with tiny bits of meat. They live best in a clean, cool tank. Salamanders love to hide so you can plant lots of mosses, ferns and greens.

Find your way from start to finish through the salamander and up to the earthworm.



START

FINISH

Letters

Write On!

Dear 3-2-1- CONTACT,

I think it would be neat to have a pen pal. I wish you would print a pen pal list.

Chris Bartnicki
Eden, NY

Dear Chris,

Pen pals are a great way to make friends and learn about different places. Here are two groups that can help start you off. To find a pen pal in a foreign country, write:

The International Youth Service
SF 20101 Turku 10, Finland

For information on how to get a pen pal in the U.S. write to:

American Sharing Program
Route 1, Box 798
Beaverton, Oregon 97007

Include a stamped, self-addressed envelope with your name, address, and age.

Pretty Funny

Dear 3-2-1 CONTACT,

What I wanted to know is if you could put in some funnies or a do-it-yourself cartoon!

Susan Eddy
Thompson, CT

Dear Susan,

Talk about timing. This month's CONTACT features an extravaganza for comic lovers—comic book Mutants. And check out EXTRA! It just may be a contest that tickles your fancy or funny bone. We went looney tunes thinking it up! And we've got even more looney contests up our sleeves. Watch for them!

Foreign Correspondence

Dear 3-2-1 CONTACT,

In your July/August issue, a girl wrote and asked if kids in other

countries get your magazine. Did you know that a lot of your readers aren't American? In fact, they've never been to the U.S.!

Jennifer Valentino
Milan, Italy

Dear Jennifer,

You gave us an idea that has our stamp of approval. We'd love to hear from our readers who live outside the U.S. So, attention, all you foreign correspondents out there! Send us a picture postcard of where you live and tell us a little about yourself. We'll print some of the postcards to spread the news.

Animal Lover

Dear 3-2-1 CONTACT,

I liked the article about the underwater explorers in the July/August issue except for the photo of the dead shark. It's cruel to kill innocent animals. I don't think you should have pictures like that in your magazine.

Marcie Shewan
Laurel, MD

Dear Marcie,

The shark you see in the photo was already dead when the explorers discovered it. Also, we share your feelings about cruelty to animals.

Shop Talk

Dear 3-2-1 CONTACT,

How do you get to talk with the people you write about?

P.S. I enjoyed your article on "The Lost Civilization" in the May '84 issue. I want to be an archeologist when I grow up and the story encouraged me!

Dane Murphy
Swarthmore, PA

Dear Dane,

We're glad you asked! When we do interviews, such as the ones with the underwater photographers or the gorilla expert, Dian Fossey, we talk to them either face to face or over the phone.

Often we go right to the scene (and to the heart) of the story, as in "The Lost Civilization".

We Want Mail

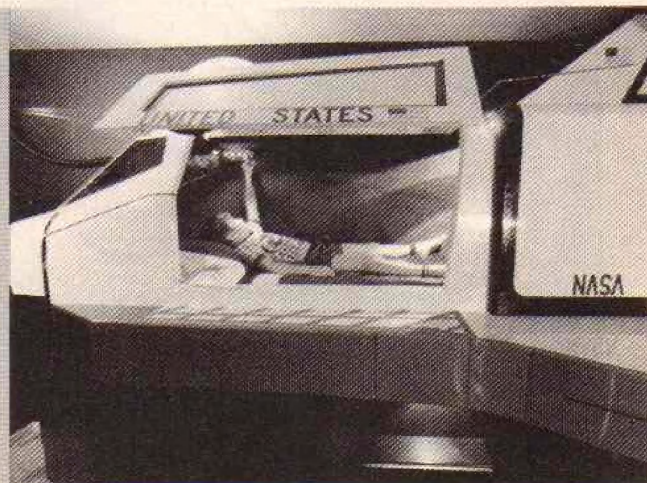
Dear Readers,

We really love hearing from you. The questions, ideas, and complaints we get help us make CONTACT a better magazine. So why not drop us a line? We can't answer every single letter, but we do read them all. Send your mail to

3-2-1 CONTACT Letters
P.O. Box 599
Ridgefield, NJ 07657

Sweet Dreams and Happy Landings!

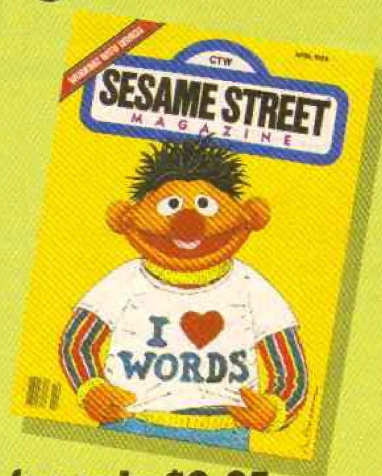
David Connolly of Hoffman Estates, Illinois, sent us this photo of his bed that looks like the space shuttle. David's dad built it. David told us that when he saw the bed, he couldn't believe it. "It was so neat. It even had a clubhouse underneath!" he told CONTACT.



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Did It!

Far Out (page 2)

1. NINE
2. GIRAFFE
3. REPTILES
4. HIVES
5. GALAXY
6. CHEETAH
7. BRAIN
8. OCTOPUS
9. HEART
10. LION
11. ELBOW

The message is:
ONE GIANT LEAP FOR MANKIND

Treasure Hunt (pages 18-19)

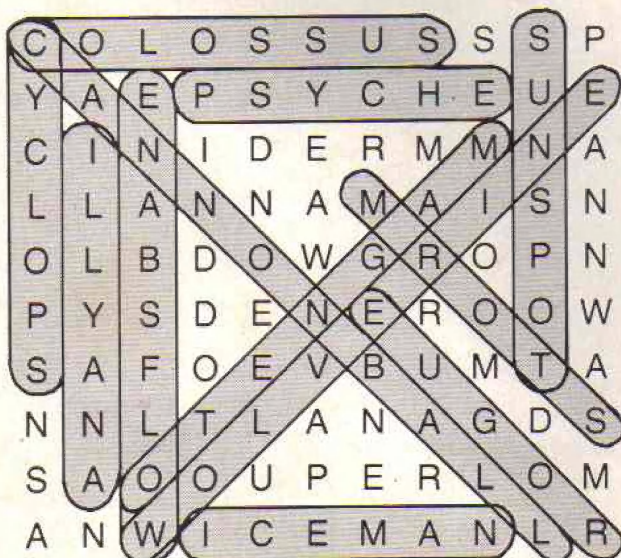
1. BALDMAN
2. HICKS
3. SHUCKSTER
4. DUDSON RIVER
5. CHARTER LAKE
6. BLACKBEARD SWAMP

The jewels are hidden in:
ACKS ORCHARD

Compass Code (page 29)

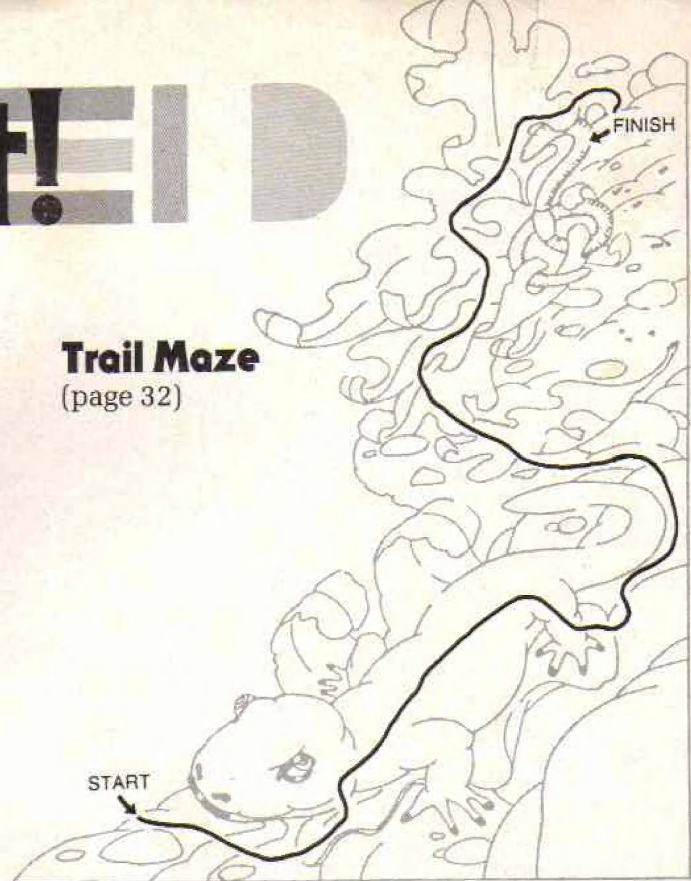
What holds the world but fits in your pocket? A map.

Superhero Search (page 30)



The answer is:
SPIDERMAN AND WONDERWOMAN AND SUPERMAN

Trail Maze (page 32)



Thank You!

Thanks to our student intern, Liz Hartzell, for her help with this issue.

Thanks to Tom Martin, a seventh grader, for his help with the mutant story.

Thanks to Helma Weeks for her help with the animal hospital story.

Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

Life at the Top

Meet a scientist who lived and worked in the tree-tops of a rain forest in Central America.

Super Sneaks

What do Olympic gold medal winners say about their lucky sneakers? Wait until next month to find out!

**Plus Factoids, Puzzles,
Any Questions?
and More!**



PHOTO © CAROLLEE PELOS FROM HER EXHIBITION "SPECTACULAR VERNACULAR" TOURED BY SITES AND HER BOOK PUBLISHED BY GIBBS M. SMITH

Mud Castles

In some cases, a step backward is a step ahead. At least it is in the case of this fantastical building in Mali, a nation in west Africa.

The building is made of unbaked, sun-dried earth. In other words—mud! People living in desert climates have found that mud is often better than concrete in keeping buildings cool. It is also a lot less expensive than concrete—and it lasts longer in the hot, dry desert.

Of course, not every building in Mali is made of sun-dried earth. But architects and builders say it's a clever use of a material that is easily available and well-suited to desert architecture.

3-2-1 CONTACT
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